Precision With Glass Jewels

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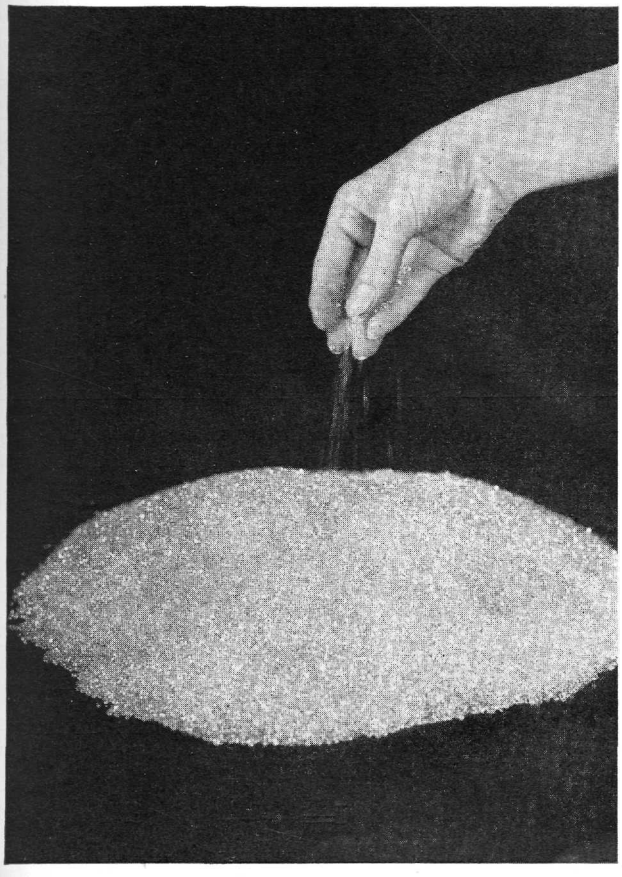
TO replace hard-to-get sapphire jewels used in precision instruments, glass vee jewels and glass ring jewels have been developed. Formerly, industry depended on jewels made from natural or synthetic sapphires by skilled Swiss workers; but the insufficiency of the supply from this source made it necessary to develop a product to take the place of the foreign-made jewels.

Glass ring jewels are an outgrowth of experimentation with glass vee jewels. These pieces are no larger than the head of a pin. One end of the jewel is flat, highly polished with a satisfactory abrasive. The other end is bell-shaped. The inside of the bell is fire-polished, and the edge around the hole is chamfered slightly. The edge of the flat-surfaced end is also chamfered. This prevents the jewel from becoming chipped in its transportation. Vee jewels are so named because of the V-shaped depression in the flat top of each jewel in which a steel pivot rotates.



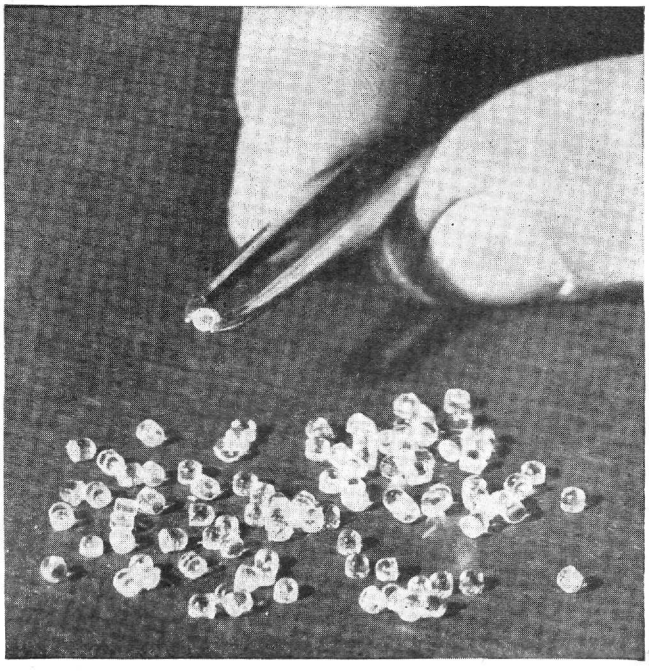
—Courtesy General Electric.

There are approximately 450,000 vee jewels in this small pile

In the manufacture of the jewels, it is necessary to allow only very small tolerances in the dimensions. Experiments have been made producing rings from .005 in. to .5 in. in diameter, but most of the rings fall into five size groups. Three of these conventional diameters are 0.100 in., 0.0787 in., and 0.064 in. In separating and shipping the jewels, a unique counting method is used. The jewels are placed in a counter with 1000 holes punched in it. The counter is shaken until all of the holes are filled, and when a slide underneath the counter is pulled out, the jewels drop into a tray below. Prior to shipping, the jewels are examined for flaws under a microscope having a magnifying power of 40 diameters. After being inspected, the jewels are placed in three different positions and cleaned in a watch cleaning machine. Between each position they are spun dry for a period of five minutes.

These jewels find use in precision instruments employed in field radio sets, radio control equipment aboard planes, ships, and tanks, mobile power stations, and searchlights. They may be utilized also in thread guides, weighing scales, and speed meters.

Comparison with the formerly used sapphire jewels has shown that in many ways the glass jewels are superior to their predecessor. They may be obtained at approximately one-third of the cost. Glass jewels are available at $120 per thousand. The jewels are more durable than the steel pivots they support, since they will withstand a greater shock than the pivot is able to.



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An assortment of typical vee jewels